

Subject: Bloom Energy - EPA Follow Up Questions

1. The number of Energy Servers at the Red Lion Delmarva site in Delaware and the amount of used filter material shipped off-site from that site

There are 134 Energy Servers at the Red Lion Delmarva site

In 2015 there were a total of 847 canisters removed from the Red Lion site. The January (132 canisters) and April (231 canisters) shipments were on a hazardous waste manifest as Bloom was awaiting the DNREC decision on the MPU exemption. All remaining 2015 shipments (484 canisters) were shipped as solid waste.

All Delaware shipments in 2015 were handled by Maumee Express, a transporter permitted by DNREC for solid waste and hazardous waste transportation.

(Maumee Express Permits attached).

2. The input streams into the Energy Servers and the outputs (emissions, water, etc.) related to Bloom's energy generation process

Fuel Cells use electrochemical reactions to convert incoming natural gas and ambient oxygen into electrical power. Byproducts of the process are primarily water and carbon dioxide. Emissions of Bloom Energy Servers are:

- Oxides of nitrogen no greater than 0.07 pounds per megawatt-hour;
- Carbon monoxide no greater than 0.10 pounds per megawatt-hour; and
- Volatile organic compounds no greater than 0.02 pounds per megawatt-hour.

3. The amount of time between when sulfur breakthrough is detected and when new filters are installed

Bloom monitors Energy Server performance with the objective of installing units with new filters before the existing filters experience a decline in effectiveness. When Bloom monitoring of Energy Server performance indicates that filter performance has begun to decline prior to its scheduled maintenance, canisters are replaced within 1 week.

4. The MSDS for both the Clariant and Unicat adsorbent material

Unicat canisters contain the following filter materials: Unicat TSR-122E, Siliporite, and Calgon Carbon BPL 6x16.

Clariant canisters contain the following filter materials: Clariant HYPROGEN GS-6, Clariant HYPROGEN GS-23, and Calgon Carbon BPL 6x16.

(MSDS for all materials attached).

5. How Bloom initially found out VOCs (benzene) and metals were present on/in the used filter material

Prior to October 2013 the filter media was managed in California and disposed of as a California (non-RCRA) hazardous waste due to metals content. After cleaning operations were transferred to Unicat in Texas, additional samples of the filter media were collected and analyzed. Results received on October 10, 2013 from Precision Petroleum Labs, Inc. indicated that some of the media exceeded RCRA limits for benzene. At that point cleaning operations were stopped pending confirmation testing. Additional analytical results from October 22, 2013 confirmed that some media exceeded RCRA limits for benzene. In November 2013 profiles were submitted to a TSDF and Bloom applied for an EPA ID as hazardous waste generator at the Unicat facility. Bloom received preliminary approval from TCEQ in late November and a permanent EPA ID and Notice of Registration (NOR) on December 05, 2013. In addition, all personnel at Unicat were trained to ensure compliance with EPA and OSHA regulations.

6. The sampling methodology for the analysis of 4 samples from Delaware (January 2015) and whether any portion of the used filter material shipped with this shipment was sent for recycling

Samples tested were composite samples for each of the 4 sites. There were only Unicat canisters in these shipments and the TSR-122E (approximately 22wt%) was recycled.

(Certificate of Consumption attached).

7. The weight of an empty Unicat desulfurization canister; weight of an empty Clariant canister

The same canisters are used for both Unicat and Clariant filter materials. At the Red Lion Delmarva site only one canister type is used. It is referred to as Catalina. Empty canister weight: Catalina 84.7 lbs (38.4 kg)

8. How the different handlers of used filter material (transporters, transfer facilities, and destination facilities) are managed in the canister tracking system database

At the moment of disconnection from the energy server, the following data is collected by Bloom Energy field service personnel:

- Part Number & Serial number,
- Pad ID,
- Site Address,
- Canister Removal Date,
- Product Type.

Bloom also tracks the following data:

- Ship Date,
- Shipper Name;
- Tracking number;
- Estimated arrival date at VLS.

VLS tracks and reports the following data:

- Part Number & Serial number;
- Date canister received,
- Date canister cleaned,
- Date media disposed,
- Original Manifest.

The TSDF signs the manifest and sends the signed copy back to VLS and Bloom.

(Tracking Process Details attached).

9. The date Bloom switched from using Unicat as a transfer facility to using VLS Bayport and any information on why that switch occurred

The transition period from Unicat to VLS was between January 2015 and March 2015. During this time period, Bloom migrated from Unicat filters to Clariant filters. The change from Unicat to VLS also allowed Bloom to manage the canisters more efficiently

10. Any shipments of used filter material from any Bloom facilities in Delaware that occurred after January 2015 and the handlers/facilities that received the material

All shipments from Bloom Delaware facilities during this period were transported by Maumee Express and shipped to VLS Bayport.